

Cumulative Biological Impacts Framework for Solar Energy Projects in the California Desert

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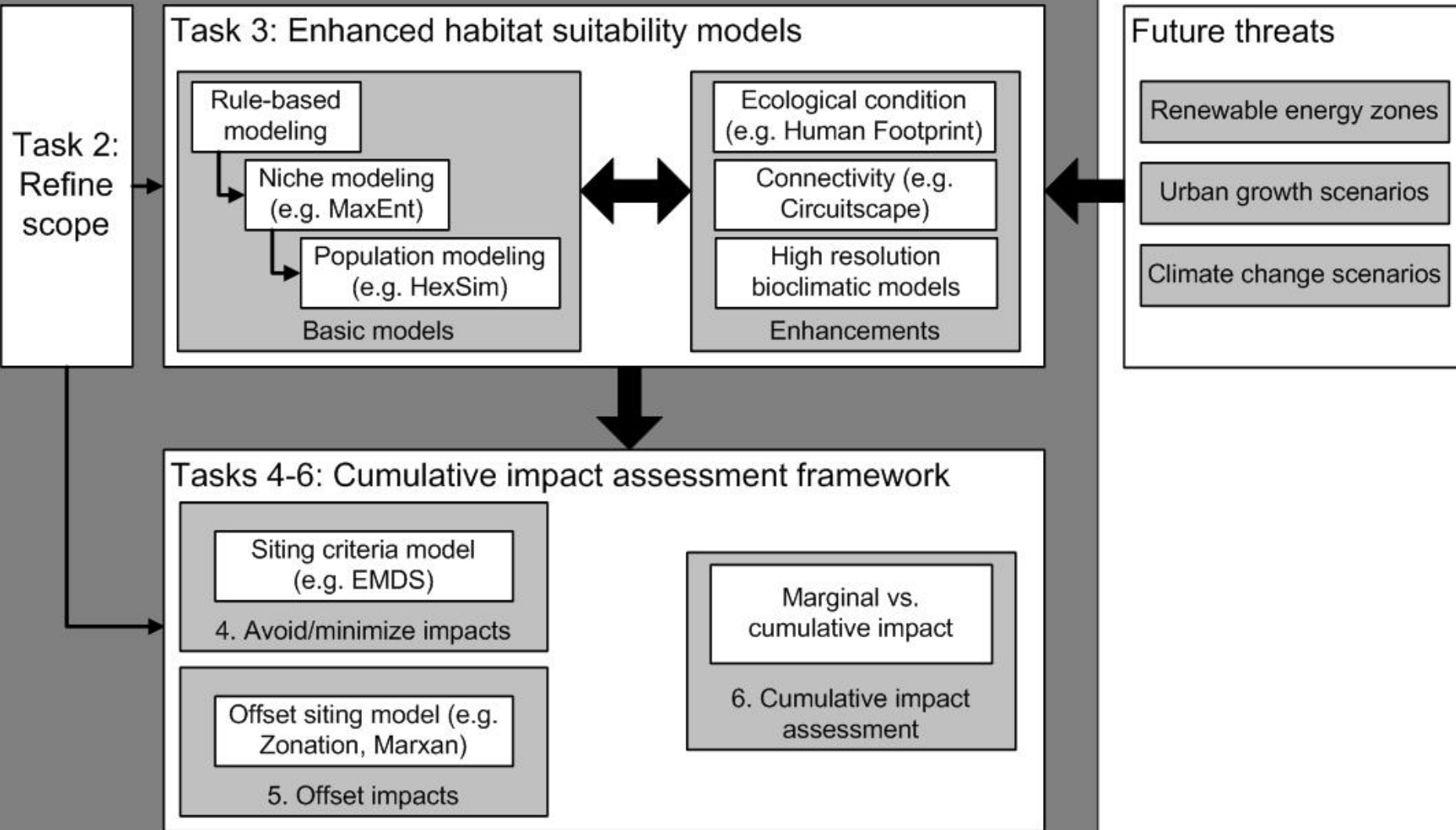
Jason Kreidler, USGS

Alan Flint, USGS

Goals and Objectives

- Goal
 - Create a scientifically rigorous, practical approach for assessing cumulative biological impacts caused by new solar energy projects in California deserts
- Objectives
 - Develop a framework for conducting cumulative impacts assessment of solar energy projects and their interaction with future urban growth and climate change;
 - Improve data and tools for avoiding or minimizing impacts (siting criteria) and for offsetting impacts.

Project flowchart



Species distribution models



Figure 141: Image of *Xantusia vigilis* (Desert night lizard)

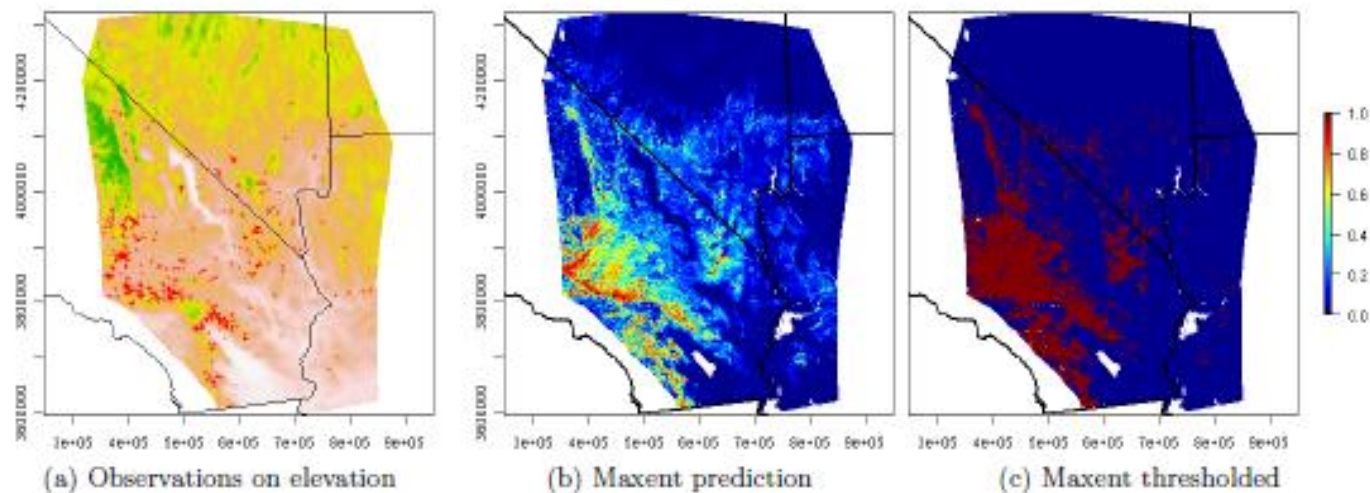


Figure 142: Maxent outputs for *Xantusia vigilis* (Desert night lizard)

Species for SDMs

- Terrestrial Species
 - Species of planning interest (ISA_DRECP 2010)
 - Covered species
 - Other species of interest (ISA_DRECP 2010)
 - Invasive species

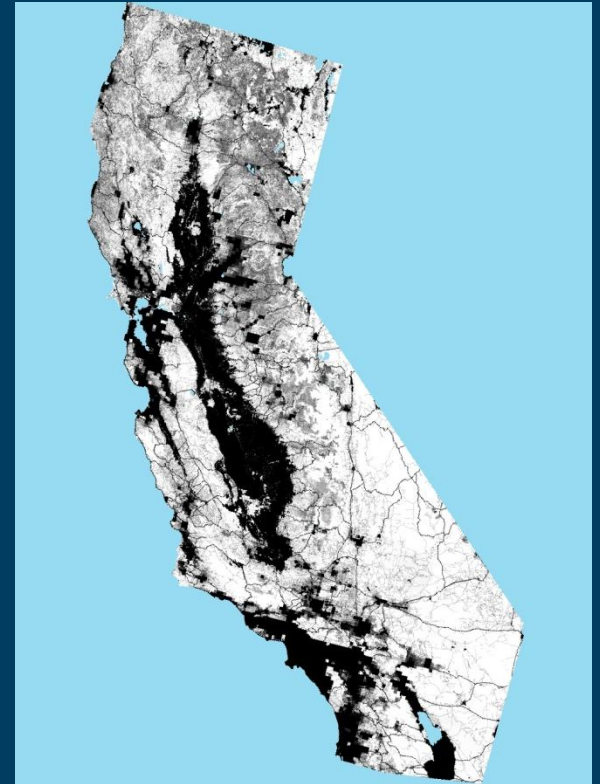


Astragalus tricarlinatus

www.calflora.org © 2004 John Green

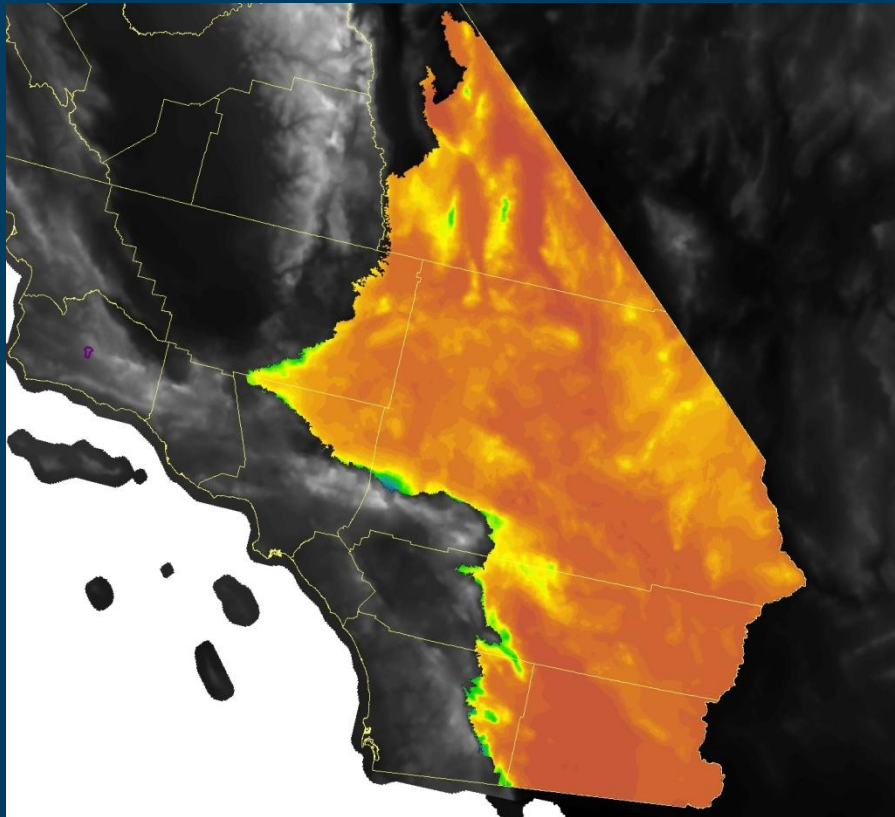
Environmental data

- Land use/land cover
 - Interim vegetation maps?
- Landscape condition
- High resolution climate grids
 - Historical
 - Climate change scenarios
 - Mid-century
 - Late-century

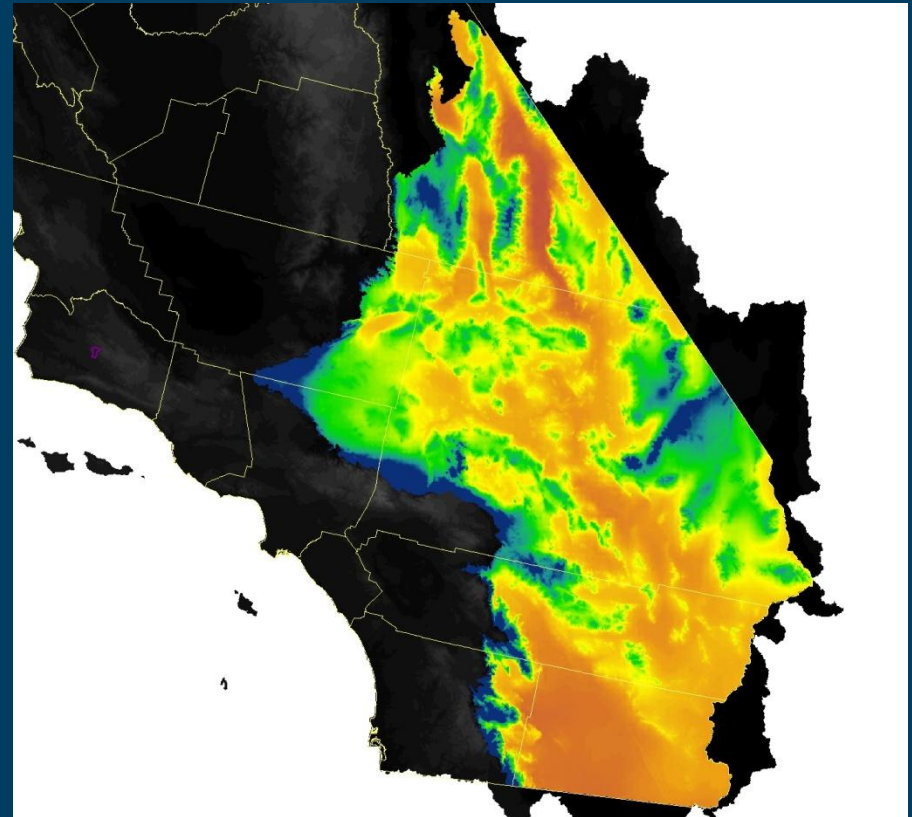


Example of ecological condition index

High resolution climate grids for species distribution models

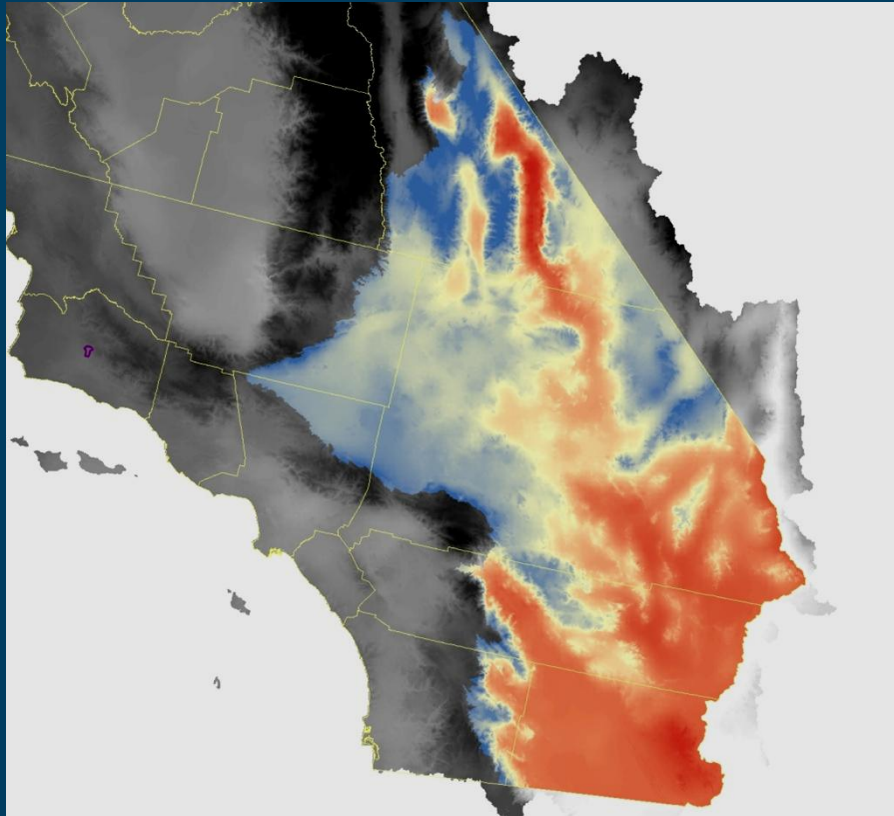


Mean annual PPT, 1971-2000
PRISM 800 m

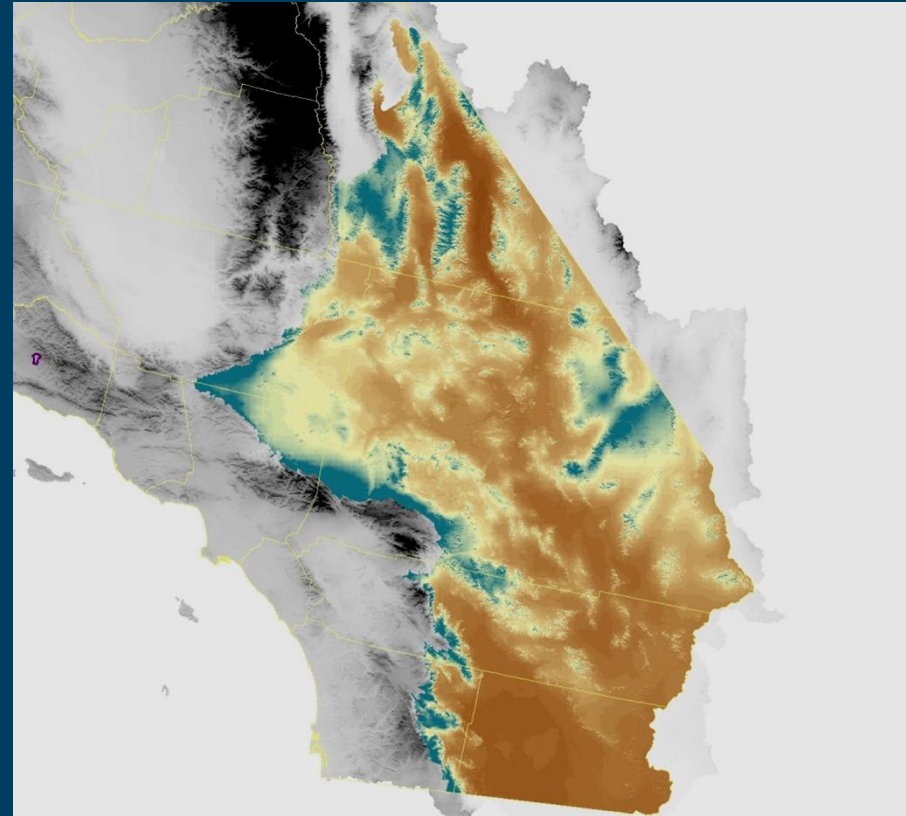


Mean annual PPT, 1971-2000
A. Flint, USGS, 90 m

High resolution Bioclimatic variables

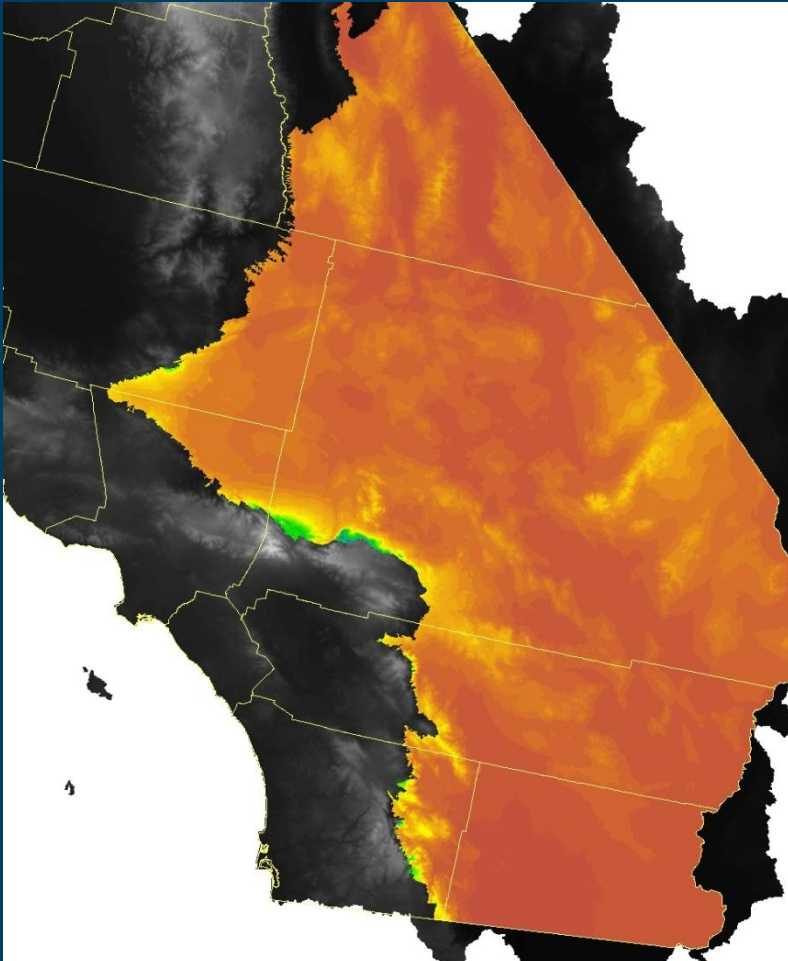


Growing degree days, 1971-2000

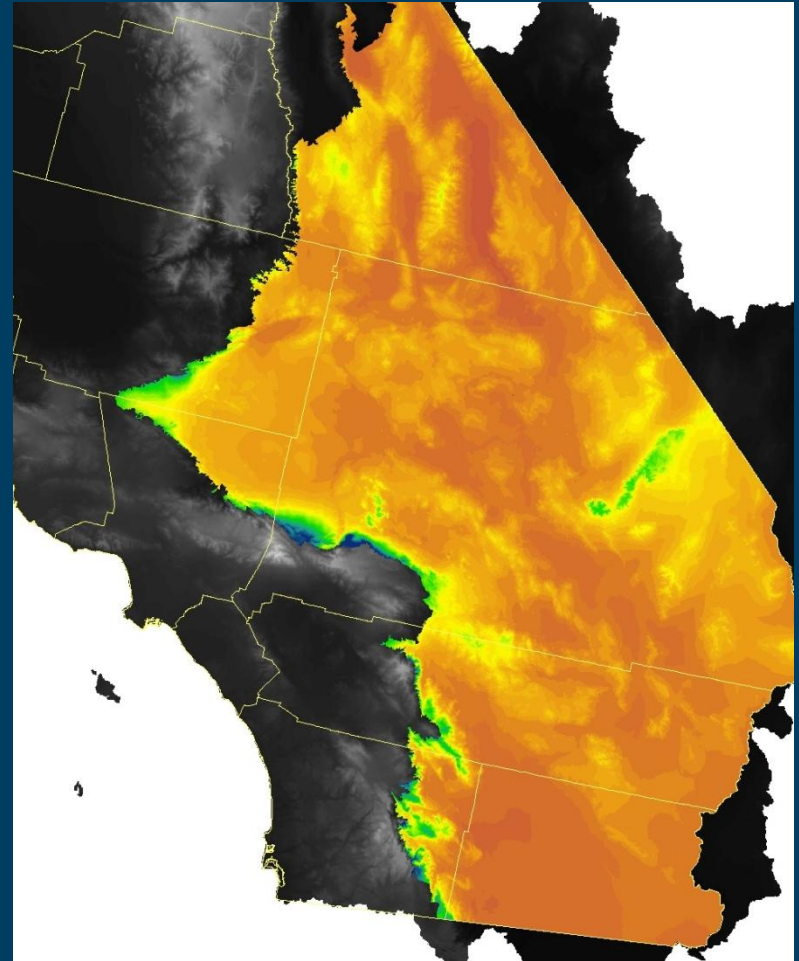


Aridity, 1971-2000

Climate scenarios



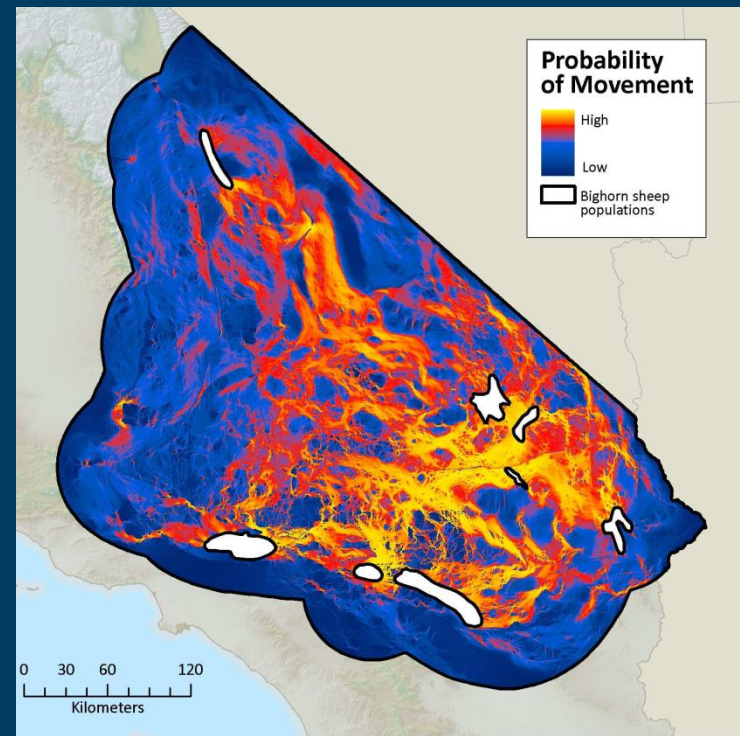
Mean annual PPT, 2071-2100,
GFDL-A2



Mean annual PPT, 2071-2100
PCM-A2

Tools for cumulative effects analysis

- Niche modeling
 - Maxent, etc.
- Core conservation areas
 - Zonation
- Connectivity analysis
 - Circuitscape
 - Hexsim individual-based models
- Dynamic range modeling
 - Biomove



Bare et al. (2009)

Planning support

- Suitability analysis
 - Avoid/minimize impacts
- Offsets analysis
 - Location
 - Ecological Similarity
 - Condition
- Cumulative impact analysis
 - Regional and subregional perspective
- Uncertainty and risk analysis

Tentative Timetable

Milestone	Date
Project start	Feb 2011
Project scoping; Finalize target species and communities	March 2011
Species distribution models completed	September 2-11
Suitability analysis	July 2011
Biodiversity Offsets analysis	Feb 2012
Habitat scenarios	May 2012
Cumulative impacts framework	August 2012

Scoping questions

- How best to coordinate with other projects to minimize unwanted redundancy?
- Users of project deliverables
 - Who?
 - How? Products vs. planning tools?
- Priorities; timing of deliverables?



Courtesy of A. Conrad-Saydah